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PROTECCION TECHNICA ECOLOGICA (PROTECO) INC.
PART B PERMIT APPLICATION
PRD 091018622
PENUELAS, PUERTO RICO

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SECTION I

CLOSURE PLAN

I-1 General Closure Plan

Written plans and procedures for the closure of hazardous waste management facilities are required by regulations promulgated by the Environmental Protection Agency (EPA). As such, the closure and post-closure plans for the PROTECO site are hereby submitted in accordance with the requirements of 40 CFR Part 264.112 through 118, 264.178, 264.197, 264.288, Part 264.310, Part 264.351, Part 270.14(B)(13), (14), (15), (16), (17) and (18), as well as specific requirements contained in the Commonwealth of Puerto Rico Environmental Quality Board Rule 805. In addition, written cost estimates for closing the facility in accordance with the regulations and a written estimate of the annual cost of post-closure care are submitted herein.

Section I-1 of this document describes the various waste processing, treatment and disposal units and presents the method by which PROTECO intends to close the facility, following the scenario described in Section I-1a.

Provisions for post-closure care are presented in Section I-2, followed by the cost summaries for closure and post-closure care in Sections I-4 and I-6. Detailed cost estimates for closure and post-closure of waste management units are provided.

Section I-3 provides the required Notice in Deed and Notice to Local Land Authority. Section I-5 provides the financial assurance mechanism for closure, and Section I-7 provides this assurance for post-closure care. Liability insurance is addressed in Section I-8.

Existing regulated units which were previously covered in this Part B Application section have been removed and form the basis of an existing unit closure plan to be submitted to the Agency at a later date under

separate cover. The existing units are not a part of the Part B permit application, but will be closed according to applicable regulations affecting the closure of each unit.

I-1a Closure Performance Standard

In accordance with 40 CFR Part 264.111, the closure plan is designed to ensure that the facility will not require further maintenance and controls, will minimize or eliminate threats to human health and the environment, and will prevent the escape of hazardous wastes or hazardous waste constituents, leachate, contaminated rainfall or waste decomposition products to the ground, surface waters or to the atmosphere.

PROTECO will achieve this standard of closure by the removal of all unprocessed hazardous wastes and hazardous waste residues, by decontamination and removal of all process and associated equipment except buildings and salvageable equipment which will be decontaminated and left in place, and by regrading all hazardous waste process areas subsequent to closure. these areas will be covered with clean fill and vegetated following the completion of all other closure activities.

The following sections discuss in detail the procedures and actions that will be taken in order to satisfy the closure performance standard.

During the site's operational lifetime, conditions or operations may be modified such that the Closure and Post-Closure Plans will require changes. The General Manager, or his designate, will be responsible for maintaining and updating the plans both prior to and after closure of the site. The General Manager may be contacted at the following address and phone number:

PROTECO, Inc.
Firm Delivery
Ponce, PR 00731
(809) 836-2058

A copy of the approved closure plan (and all the revisions to the plan) will be maintained at the PROTECO facility until the certification of closure completeness has been submitted and accepted by EPA Region II. The Region II Administrator will be notified at least 180 days prior to the date final closure is initiated. Upon completion of closure, a certification prepared by an independent Professional Engineer registered in the Commonwealth of Puerto Rico, stating that the facility has been closed in accordance with the specifications in the approved closure plan, will be submitted to the Region II Administrator.

A copy of the approved post-closure plan (and all revisions to the plan) will be kept at the Facility until the post-closure period begins. PROTECO will submit this post-closure plan for approval at least 180 days prior to the commencement of closure.

The closure documents for this RCRA Part B Permit Application were prepared using the cost of closing all hazardous waste operational areas by a third party in the event of sudden and total abandonment of the disposal site by the operator. The applicable basic assumptions for closure as recommended are:

- The maximum volume of untreated or other hazardous wastes remaining on-site will be treated and/or disposed of on-site.

- All waste storage tanks and associated piping, valves, and control devices will be cleaned, disassembled and landfilled on-site, unless it is economically feasible to salvage them, in which case they will be cleaned (and in which case, the plan and cost estimate will be modified).

- The Stabilization/Fixation Facility including associated equipment, piping, pumps, valves and control devices, will be cleaned, disassembled and landfilled on-site.

- All building structures will be left in place. They will be decontaminated after the removal and disposition of wastes, as described above.

- Fifty percent of all transportation equipment (e.g., trucks, trailers, roll-off containers), all heavy equipment (e.g., scrapers, front-end loaders, bulldozers, back hoes) and all other mobile equipment (e.g., fire trucks, pickup trucks, maintenance trucks, portable generators and air compressors) will be assumed inoperable and will be removed, cleaned and scrapped, if possible. If the equipment cannot be scrapped, it will be landfilled on-site. The remaining fifty percent of equipment, assumed to be still operable, will be cleaned and moved for use at another site.

- All supplies and non-waste handling equipment will be salvaged.

- The main road and parking areas serving the process area of the facility will be thoroughly swept and the sweepings will be landfilled on-site.

- The perimeter fence, gates and signs will be repaired, if necessary, and left in place.

- Except for the building structures, main road and parking area, which will be left in place, the site will be left with an appearance that conforms to the natural setting of the surrounding area.

- All buildings and equipment to be decontaminated will be cleaned by thorough washing with a high-pressure stream of water, followed by steam cleaning. In some instances, detergents or solvents may be added as necessary to enhance decontamination. Rented mobile equipment will be cleaned and decontaminated prior to being returned to owner.

- Once all process equipment has been removed, the concrete surface in the process areas will be decontaminated with high-pressure water, followed by steam.

- Decontamination will be deemed complete after rinseate sampling and analysis confirm that hazardous constituents are no longer present at hazardous levels.

- All contaminated stormwater in storage areas will be removed by vacuum truck and processed in the on-site Stabilization Fixation Facility.

- Landfills and the leachate treatment/storage facility are the only repositories that will contain hazardous wastes during the post-closure period.

- As required by 40 CFR 264.113(b)(2), PROTECO will take all necessary steps to prevent the occurrence of threats to human health and the environment from the unclosed but inactive facility.

I-1b Partial and Final Closure Activities

Closure plans for the above-grade landfill site and the process facilities are presented in the subsequent sections of this application. The aggregate closure schedule for all proposed facilities is given in Section I-1f. Total estimated time for closing the entire facility, based on on-site disposal, is 180 days.

All hazardous wastes and residues removed during partial closure will be disposed on-site when possible. Those wastes which can not be stabilized will be trans-shipped to the mainland for incineration. PROTECO will notify the EPA at least 180 days prior to initiating any final closure activities. Expected initiation of closure will be within 30 days after the final volume of waste is expected to be received.

I-1c Maximum Waste Inventory

For the purposes of this closure plan, proposed facilities at PROTECO will be assumed to contain the maximum volume of wastes indicated in Table I-1 at the time of closure.

I-1d Inventory Removal, Disposal or Decontamination of Equipment

All buildings and equipment to be decontaminated will be cleaned by thorough washing with a high pressure stream of water, followed by steam cleaning. Detergents or other cleaning additives may be added to the water, as necessary, to enhance decontamination. The use of cleaning additives will be determined by the visually-observed ability of washwater to remove contamination, historically known materials which have required additives in the past, and absence of contaminants in the washwater. Decontamination will be deemed complete when concentrations in the washwaters fall below concentrations conforming with regulations established at that time. Washwaters determined to be hazardous by laboratory analysis will be collected by vacuum truck and treated on-site in the Stabilization/Fixation Facility which will be closed just prior to the final landfill section. A proposed sequence of unit closures is presented in Table I-2. 2

Outside contractors working on-site will provide their own personnel protective gear. All PROTECO personnel involved in the decontamination of the process facilities will be provided with protective equipment. PROTECO personnel will be equipped with acid/solvent resistant splash suits and hoods, steel-toe rubber boots, rubber gloves and self-contained breathing apparatus with full-face respirators. In addition, wrists and ankles will be taped to protect against splashes. The self-contained respirators will be used primarily for initial entry and decontamination of enclosures such as tanks. However, other types of respirators used in conjunction with hard hats and splash shields may be used in later phases of decontamination or for decontamination of more ventilated facilities or outside equipment. The respirators will have appropriate filter cartridges that seal directly to the mask.

TABLE I-1

MAXIMUM WASTE INVENTORY AT PROPOSED FACILITIES

FACILITY	METHOD OF CONTAINMENT	QUANTITY (ESTIMATED)	MAXIMUM INVENTORY	WASTE CATEGORY
Container	55 gal Drums	1025	56,375 gallons	Hazardous Waste/ Various Categories
Tank Farm	Tanks 1	1	15,000 gallons	Caustic
	Tanks 2	1	30,000 gallons	Acid
	Tanks 3	1	10,000 gallons	Neutralization liquids
	Tanks 4	1	10,000 gallons	Solvents
	Tanks 5	1	10,000 gallons	Solvents
	Tanks 6	1	30,000 gallons	Oil Sludge
	Tanks 7	1	15,000 gallons	Aqueous Waste
	Tanks 8	1	30,000 gallons	Oils
Stabilization/ Fixation	Tanks	2	4,000 gallons	Hazardous Waste/ Various Categories
	Sump	1	1,000 gallons	Hazardous Waste/ Various Categories
	Silo	1	21,100 gallons	Fly Ash
	Solids/Sludge		20 cy	Solid Hazardous Waste
Stormwater Retention Basin		1	10,000 gallon	Hazardous Waste/ Various Categories
Landfills I & II			100,000 cu. yds.(1)	Hazardous Wastes/ Various Categories
Leachate Ponds A & B			120,000 gallons	Hazardous Wastes/ Various Categories

NOTES: (1) Value is maximum volume for both landfills. Volume does not effect closure cost estimates.
(2) Decant Facility does not have any storage volume.

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TABLE I-2

PROPOSED SEQUENCE OF UNIT CLOSURES

Unit	Unit to Receive Waste
1. Container Storage Building	Container Decant Facility, Tank Farm, Stabilization/Fixation Facility On-Site landfill
2. Decant Facilities	Tank Farm, Stabilization/Fixation Facility On-Site Landfill
3. Bulk Storage Tanks	Stabilization/Fixation Facility On-Site Landfill
4. Stormwater Retention Basin	Stabilization/Fixation Facility On-Site Landfill
5. Stabilization Fixation Facility	On-site Landfill
6. Secure Landfill	In-situ disposal
7. Leachate Ponds A & B[1]	Closure of 1 Unit as Disposal Impoundment

Note: 1. Leachate Ponds A & B will continue to operate during the Post Closure Period. See Section I-d(4) for closure plans.
2. Materials which can not be stabilized will be transported to the mainland for incineration.

Facilities will also be provided for personnel decontamination at the completion of each work interval.

Closure of the various waste storage, process and treatment units other than landfills includes the following common procedures:

- Discontinue receiving hazardous waste
- Identify, classify and remove inventory
- Prepare inventory for on or off-site disposal.
- Decontaminate equipment and structures
- Test for contamination
- Remove and dispose of appurtenances such as wiring, piping, valves, etc.
- Decontaminate equipment used for closure
- Proper stabilization/fixation and disposal of decontamination fluids and/or contaminated soils on-site.

In the following sections, specific detailed closure procedures are described for each of the waste management units or operations at PROTECO. These closure procedures have been developed so as to provide a detailed instructional document which will ensure the proper implementation of this plan.

I-1d(1) Closure of Container Storage Facility.

I-1d(1)(a) General Closure. Closure of the container storage facility will follow the general closure procedures outlined in Section I-1d. The schedule for the closure of these areas is given in Figure I-1.

I-1d(1)(b) Closure Procedures. Upon the delivery of the last containers of waste to the handling area, an inspection and inventory of each section of the area will be performed. The inspection will be performed to: (1) verify that actual inventory is consistent with the records of reported waste quantities, (2) confirm the integrity of all containers in preparation for inventory removal, and (3) identify spills, leaks, or cracks in the containment areas.

FIGURE I-1

CLOSURE SCHEDULE

DAY

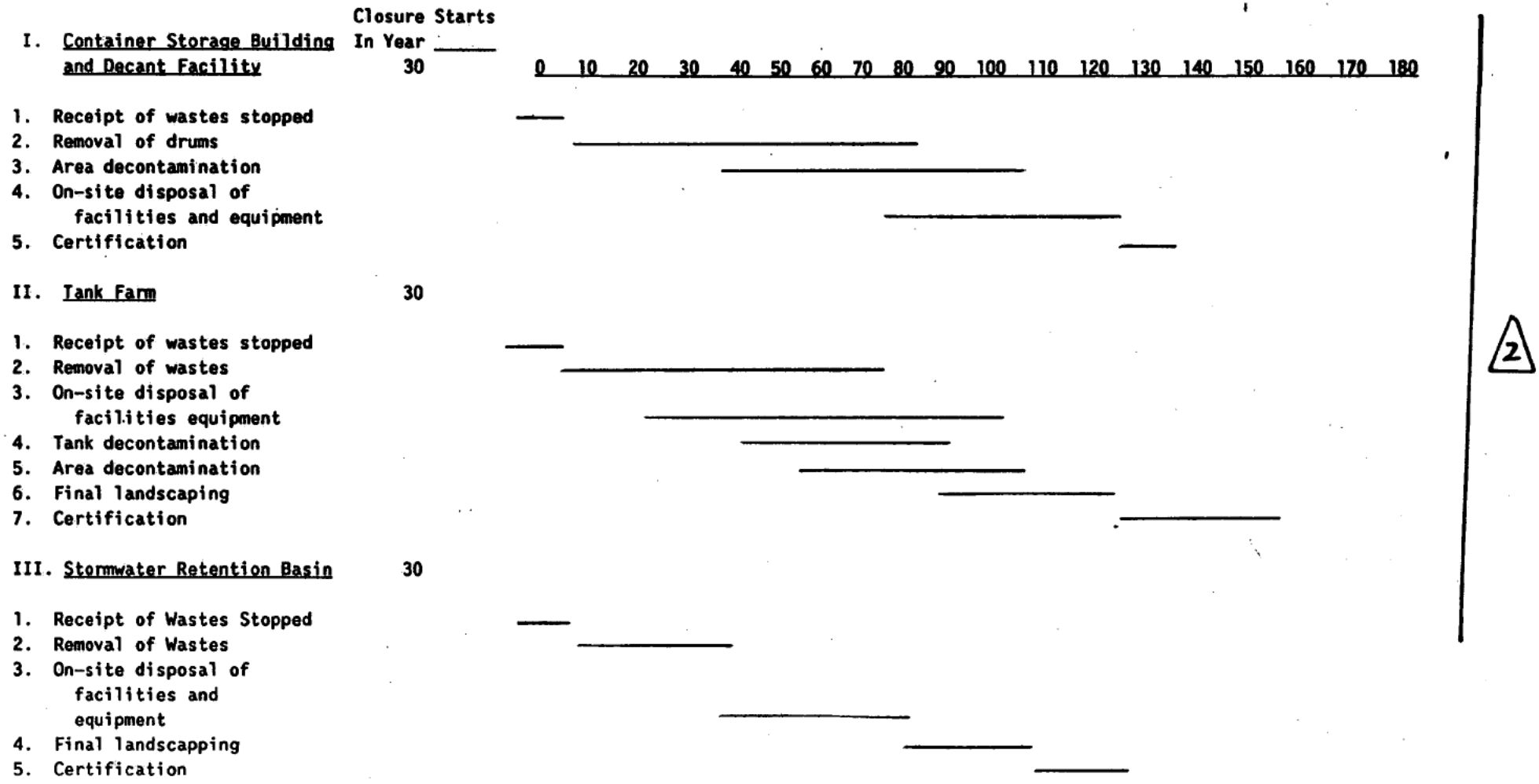
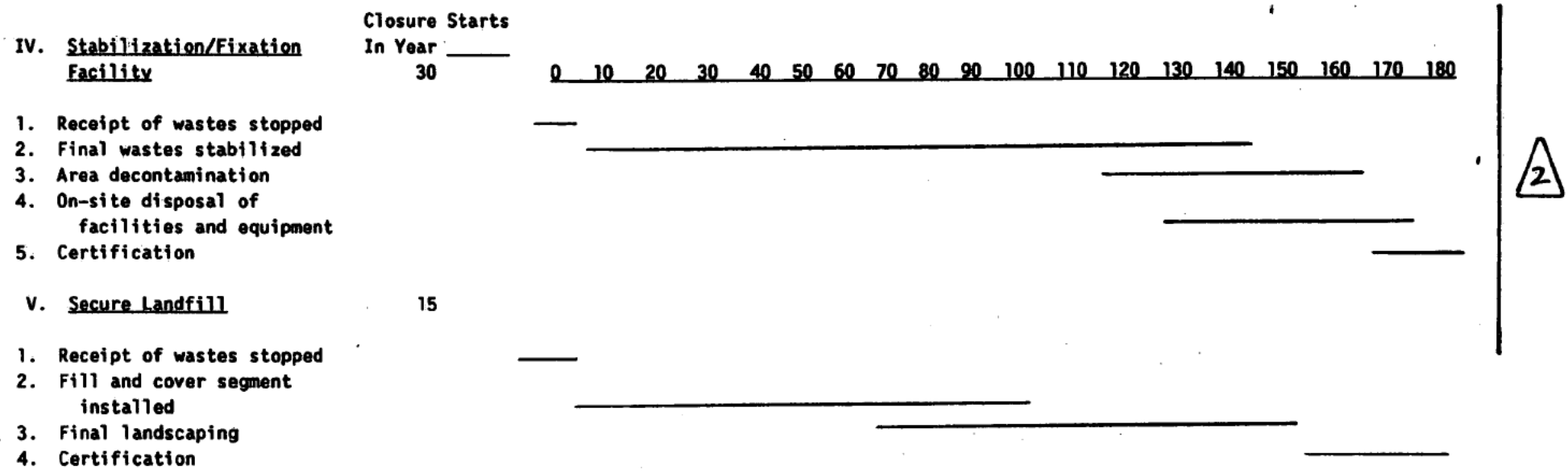


FIGURE I-1 (CONTINUED)

CLOSURE SCHEDULE

DAY



NOTE: 1. Sequences are independent by unit and not concurrent.
2. Schedule is based on final closure in normal sequence and assumes adequate equipment, manpower and materials availability. Also assumed are no delays due to adverse weather conditions.

If spills, leaks or ponded liquids are discovered, appropriate materials will be used to contain and remove liquids using procedures described in the Contingency Plan, Section G-4C. If the source of the liquid is easily identified, the material will be swept up and placed in properly-labeled 55-gallon drums. Unidentified liquids will be sampled and characterized according to the Waste Analysis Plan, Section C-2. The Lab manager will make the decision concerning analytical parameters. After the liquid is identified, similar procedures will be followed to cleanup and remove the liquid. Liquids and solids obtained in this manner will be processed in the Stabilization/Fixation Facility. The final waste inventory will be removed according to the unloading operations described in Section F, Procedures to Prevent Hazards.

For the purposes of this closure plan, it is assumed that a maximum of 1/3 of the expected inventory of 1,025 drums of containerized wastes will not be able to be stabilized in on-site facilities and will require shipment at closure. Disposal will occur by the normal facility operating procedures described in Section F, Procedures to Prevent Hazards with PROTECO personnel transporting the drummed wastes from the storage area to the certified hazardous waste transporters trucks, where it will be verified that all containers are properly labeled and manifested. PROTECO will obtain the appropriate regulatory approvals for these wastes to be transported to the mainland for certified disposal.

The inspection and inventory will also include an inventory of empty drums. This will encompass the entire facility and will ensure that no empty drums or drums containing residual contaminants will remain on-site without plans approved ultimate disposal. Any drum containing residues will be triple rinsed with rinsewaters being consolidated into batch tanks or 55-gallon drums for processing in the Stabilization/Fixation Facility. An estimated 500 gallons of rinsewater is anticipated. Drums stored at the facility which previously contained hazardous waste and are considered empty, but contain more than one inch of solid residue, will be collected and stored at the storage area. The residues will be consolidated and processed through the Stabilization/Fixation Facility. Empty drums will

be triple rinsed as described above. Empty, decontaminated drums will be crushed prior to authorized disposal.

After the final waste inventory and empty containers have been processed, decontamination of the facility can commence. Decontamination of the area will consist of a thorough washdown of the concrete floors and curbs with a mild detergent, which may contain surfactants or other additives to enhance decontamination. All liquids generated by the washdown will be contained within the containment bays. After standing washwaters are removed, the washdown will be followed by a pressure wash using a high pressure hose and/or steam cleaning equipment. An amount of water sufficient to flush any residual washwaters from the concrete pad will be used, with the water collected within the curbed area and trench. The pressure washing will be supplemented by scrubbing with a stiff broom.

All rinsewaters collected within the secondary containment system will be sampled and characterized according to the Waste Analysis Plan, Section C-2, for the appropriate contaminants to determine the effectiveness of decontamination. The waters will then be processed through the on-site Stabilization/Fixation Facility. The analysis and rinsing will continue until decontamination is found to be complete; i.e., when hazardous constituents are below specified levels as directed in the Waste Analysis Plan. The floor sumps and trench will then be rinsed with water and scrubbed where possible. After decontamination, sumps will be filled with concrete.

All spill collection areas will be similarly decontaminated. After all rinsewaters have been removed, the area will be inspected to determine if any areas require recleaning. If not, closure will be considered complete.

PROTECO personnel involved in the decontamination procedures will be equipped with appropriate personal safety equipment, which may include acid/solvent resistant overalls, head protection, gloves and boots, and full face respirators equipped with proper gas filter cartridges.

I-1d(2) Closure of Tanks.

I-1d(2)(a) General Tank Closure. This section of the Closure Plan covers storage tanks that hold hazardous wastes. Closure of all tanks which contain hazardous wastes will follow the general procedures outlined in Section I-1d. Proper implementation of these closure activities will ensure that all hazardous wastes and hazardous waste residues will be removed from tanks and loading/unloading control equipment. The closure schedule for hazardous waste storage tanks is given in Figure I-1.

I-1d(2)(b) Closure Procedures. The flow of materials entering the facility will be curtailed prior to the commencement of closure. Any waste liquid in the tanks will be identified and processed in the Stabilization/Fixation Facility where possible. The maximum storage tank inventory is shown in Table I-1.

Decontamination operations will begin by removing any liquids in the containment areas. Any liquids present will first be analyzed in accordance with the Waste Analysis Plan, Section C-2, to characterize the liquid. After the liquids are identified, they will be processed in the Stabilization/Fixation Facility. Any residual liquid on the surface of the secondary containment area will be handled as described in I-1d(1). After waste removal, the empty tank and all associated ancillary equipment will be pressure washed with hot water or steam using equipment described in I-1d(1). Compatible cleaning additives may be added to the wastewaters, as necessary to enhance decontamination. The volume of water required per rinse to accomplish thorough rinsing is estimated at three percent of the tank volume. All liquid waste feed lines, pumps and wire reinforced hoses will be back-flushed and rinsed, generating an estimated 3% of the tank volume of washwater per tank. After rinsing, the waters will be analyzed for the appropriate contaminants. The rinse process will be repeated until an acceptable level of decontamination is achieved. Hazardous wash/rinsewaters will be processed through the Stabilization/Fixation Facility. The tanks, pumps and/or piping will then be disassembled and sold as scrap or disposed of in an on-site landfill. After disassembly, all secondary containment surfaces, ancillary equipment and sumps

will be rinsed with an estimated 3,000 gallons of water. After decontamination is achieved, sidewalls will be removed so that water will not be impounded. Water falling within this area will not be hazardous.

I-1d(3) Closure of Waste Piles

The PROTECO facility does not have waste piles nor are any such facilities currently planned. Therefore, this section does not apply.

I-1d(4) Closure of Surface Impoundments.

I-1d(4)(a) Stormwater Retention Basin. The proposed Stormwater Retention Basin is for the collection and containment of spills and to receive emergency overflows caused by truck unloading. A closure schedule for the basin is presented in Figure I-1. At the time of closure, an estimated 10,000 gallons of waste remaining in the basin will be considered hazardous and will be processed through the Stabilization/Fixation Facility. The basin liner will then be excavated and transported to an on-site landfill for final disposal. Testing will be performed according to the procedures in Section C-2 to verify if soil contamination has not occurred. The basin area will then be regraded to prevent the ponding of rainwater.

I-1d(4)(b) Leachate Ponds A and B. For purposes of closure, it is assumed that one lagoon will be full (120,000 gallons). This assumption is made based on a net evaporation rate of 17.4 in./year (see Appendix I.6) and minimal leachate generation due to the placement of final cover. Each leachate pond is sized to accommodate the run-off and leachate generation from a 25 year storm (see Appendix D-6.5). Since the capacity of the ponds is double the worst-case design condition, and leachate generation during post-closure of the landfills is negligible, one lagoon full at closure is believed to be very conservative (two ponds were designed such that one can be out of service at any time, thereby providing unit redundancy for liner repairs, clean-out, etc.). The leachate ponds will remain in operation during the Post-Closure period of the landfills to treat and store any additional leachate flows. Liquids in

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the pond will be subject to evaporation, and Final Closure of the leachate ponds will occur after the 30 year post-closure period of the landfill has expired. 2

A temporary Stabilization/Fixation Facility will be used to treat the remaining sludge and sediments in the ponds. Procedures for stabilization will conform to those established by the operation of the permanent Stabilization/Fixation Facility. All stabilized leachate wastes from final closure activities will ultimately be disposed of in Pond B. Stabilized leachate will not be disposed of until an unconfined compressive strength of 1,000 psi has been achieved. A leachate collection manhole will be installed in Pond B to allow removal of any leachate generated during use as a disposal unit. Leachate will be removed by vacuum truck or portable pumping equipment for transfer to the temporary Stabilization/Fixation Facility. The liners and appurtenances of Pond A will be excavated and disposed of with the stabilized wastes in Pond B. The subsoil of Pond A will be sampled and tested following procedures in Appendix I.7 to assure there is no contamination of the subsoil. Pond A will be regraded and vegetated to prevent ponding and erosion, and to create a natural appearance. 2 2 2

Pond B will be filled with clean soil as necessary to eliminate any deficit created by existing side slopes. Clean material will be added until a 4% grade sloping downward from the center to existing side slopes is achieved. Final cover will be constructed to tie into the existing liner system. The final cover will be equivalent to Cover Design, Section I-1e(1). 2

The leachate collection manhole in Pond B will be inspected on a quarterly basis the first year. The inspections will determine leachate quantity disposal requirements and any cover maintenance which will be required. The leachate will be sampled to determine ultimate disposal. Disposal options may include transport to a Municipal Wastewater Treatment Facility or trans-shipment to the mainland for certified disposal.

Depending on leachate generation rates and cover maintenance requirements the first year, inspection intervals will be adjusted as required.

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Leachate disposal and cover maintenance will be performed as soon as practical after inspections have taken place. A follow-up inspection will be performed to assure proper corrective actions were performed.

I-1d(5) Closure of Incinerators. The PROTECO facility does not have an incineration facility. Therefore, this section does not apply to this application.

I-1d(6) Closure of Land Treatment Facilities. The proposed facility does not have land treatment units nor are any of these types of facilities planned. Therefore, this section does not apply.

I-1d(7) Stabilization/Fixation Facility

I-1d(7)(a) General Closure. The Stabilization/Fixation Facility process area will be closed following the general closure procedures outlined in Section I-1d. Proper implementation of these closure activities will ensure that all hazardous waste and residues will be removed from the equipment and the balance of the facility. A Closure schedule for this operation is presented in Figure I-1.

I-1d(7)(b) Closure Procedures. Closure of the Stabilization/Fixation Facility Area will involve disposal of the remaining waste inventory in the batch tanks and sumps (5,000 gallons). The contents in the tanks will be stabilized and landfilled. The tanks and their piping, pumps and appurtenances will be decontaminated according to the procedures set forth in Section I-1d(2)(b), dismantled and sold for scrap or landfilled on-site. Laboratory analyses of the wastewater samples will be conducted, as per the Waste Analysis Plan, Section C-2, to verify decontamination.

The remaining stabilization equipment will be cleaned and landfilled on-site. Non-hazardous process materials remaining in storage will be landfilled on-site or unloaded onto dump trucks and hauled off-site for beneficial reuse.

I-1d(8) Closure of Decant Facility.

I-1d(8)(a) General Closure. A closure plan has been developed for the proposed decant system. Closure of the decant facility will follow the general procedures outlined in Section I-1d. Proper implementation of these closure activities will ensure that all hazardous wastes and hazardous waste residues will be removed from the equipment and the area. A closure schedule for the decant facility is presented in Figure I-1.

I-1d(8)(b) Closure Procedures. Closure of the decant system will commence by halting all operations associated with the system. Once closure has commenced, no further containers may be processed by the system.

The area around the equipment will be inspected for indications of spills or leaks. Additionally, any imminent failures of equipment will be noted. If leaks or spills are discovered, they will be cleaned up and processed following the procedures outlined in Section I-1d(1)(b). Potentially ruptured equipment will be surrounded with absorbent material and spill containment devices and later decontaminated with additional caution.

Closure will proceed by removing all material in the pipes, and pumps. If the contents of the equipment is unknown, then the liquids will be analyzed according to the Waste Analysis Plan, Section C-2. Upon verification of composition, the materials will be processed through the Stabilization/Fixation Facility.

Following liquid waste removal, sludges will be removed and processed. Decontamination will then begin. All equipment in the process chain will then be steam cleaned with water cleaning agents may be added as necessary to enhance decontamination. All liquid waste lines, pumps, and wire reinforced hoses will be back-flushed and rinsed. After rinsing, the waters will be contained and analyzed for the appropriate contaminants. If the tests indicate the presence of residual hazardous contaminants in the rinsewaters, the rinsewaters will be disposed of as hazardous wastes, and the rinse process will be repeated until acceptable decontamination

has been achieved. After decontamination is complete, the pipes and pumps will be disassembled and sold for scrap or disposed of in an on-site landfill.

Upon completion of equipment decontamination and disassembly, decontamination of the surrounding area will commence. All floor and wall surfaces will be steam cleaned, with rinse waters contained, analyzed and processed as a hazardous waste if determined to be required. Sumps, trenches and spill collection areas will be similarly decontaminated. After all rinsewaters have been removed, the area will be inspected to determine if any spots require recleaning. If not, sumps will be filled with concrete and closure will then be considered complete.

I-1e Closure of Disposal Units

This section covers the closure of hazardous landfills I and II.

As discussed in Section D-6, the landfills will be operated continuously. Waste will be placed in Stage 1 to an elevation of 360 ft prior to placing waste in the second stage of the landfill. The filling of subsequent stages will continue to permit installation of the final cover from the perimeter berms. Final cover shall be completed over the initial landfill sections as soon as possible (weather conditions permitting) upon achieving capacity. If immediate closure should be required, the fill would be regraded to promote proper drainage and final cover would be placed.

Leachate Ponds A and B will remain open during the post closure period as discussed in Section I-1d(4)(b).

I-1e(1) Cover Design. The final cover of the secure landfill and Leachate Pond B is similar in design to the bottom liner system and consists of compacted clay, synthetic membrane, and vegetative cover. The perimeter of the cap is tied into the bottom liner system so as to totally encapsulate and isolate the waste placed in the secure landfill. (2)

The secure landfill is designed to shed water, and is therefore sloped downward from the center towards the perimeter. The final cover materials and thicknesses have been selected to limit infiltration into the placed wastes and thereby reduce leachate generation. Additionally, thicknesses of cover soils have been selected to reduce the possibility of waste containers or debris coming in close proximity to the impermeable materials. The final cover design which accomplishes the aforementioned objectives consists of five layers of various materials. In ascending order these layers are:

- Two feet of clay compacted to a maximum permeability of at least 1×10^{-7} cm/sec;
- A synthetic membrane (80 mil HDPE) and drainage net;
- Filter fabric
- One foot of unclassified protective cover
- One foot of topsoil suitable for promoting a vegetative cover.

A profile of the final cover is shown in "Proposed Secure Hazardous Waste Landfill Facilities", Drawing Number B511E-L27; however, final sloping and grading will be dependent upon the amount of hazardous waste present in the subcells at the time of closure.

The recommended final cover design has several advantages. First, it limits infiltration such that leachate generation, and in turn, leachate outcropping, will be strictly minimized. Second, by placing the clay under the synthetic membrane, the 80 mil HDPE should have a good supporting base, thus helping to maintain its integrity. Third, by placing the clay under the membrane, the HDPE is more accessible should any future repair be necessary; and any such remedial effort would not be hampered by the difficulties encountered in performing remedial actions immediately on top of the waste. Finally, the synthetic membrane will also keep the underlying clay from drying out during a prolonged drought. This will help prevent cracks from developing which would compromise the effectiveness of the clay barrier.

Above the synthetic membrane, the one foot of soil will provide adequate room for root growth without long-term saturation of the soil or significant buildup of excess water.

After final cover soil is completed and in place, the site will be seeded during the next growing season. Proposed seed mixes may be found in "Technical Specifications, Proposed Hazardous Waste Landfill and Surfacewater Management Facilities," dated January 31, 1986. Additional information on soil construction plans, quality assurance and drainage capacity of drainage net can be found in "Quality Assurance Manual for Installation of the Soil Component of Liner and Final Cover System," dated January 31, 1986. Temporary vegetative stabilization will be used if the time of year is such that final revegetation cannot be achieved due to less than optimum seeding conditions. Alternate seeding mixtures suitable to local soil conservation district guidelines may be substituted as appropriate for the actual topsoil used.

The final cover cap will be graded to slope from the center to the perimeter berm, and from there will make a transition to the perimeter berms as shown in "Proposed Secure Hazardous Waste Landfill Facilities", Drawing Number B511E-L20;. As previously discussed in this report, the final cover will be installed in sections, as maximum waste elevations are achieved, and final grading will be dependent upon the amount of hazardous waste present in the subcells at the time of closure.

Because none of the wastes planned to be disposed of in the hazardous waste landfill are putrescible, and therefore not subject to decomposition, landfill gas venting has been determined to not be required. At the point of closure of each landfill, a review of all material disposed of in the unit will be conducted to assure that no materials have been disposed of which can generate gases. If the review indicates that gas generating materials have been disposed of, gas vents and/or a lateral gas permeable layer below the soil liner will be provided. Calculations of soil loss and the drainage layer may be found in Appendix I.1.

I-1e(2) Minimization of Liquid Migration. Both hazardous waste landfills will have berms and subcell berms. These berms will be constructed as an integral part of the bottom liner and will keep liquids from migrating from subcell to subcell. The final cover (two feet compacted clay and 80 mil HDPE) will keep leachate from outcropping and rainwater from infiltrating into the landfill. The double lining system (detailed in Section D-6) is designed to contain leachate and convey it efficiently to leachate collection system for transfer to the treatment/storage basins.

I-1e(3) Maintenance Needs. Maintenance activities will be required to ensure the integrity of the cover, containment structures and monitoring equipment for the landfills. The succession seeding mix selected will promote rapid initial cover followed by succession to a long-term, low maintenance vegetative cover several feet in thickness.

The function and integrity of the final cover for landfills as specified in the closure plan for the facility will be maintained as necessary. A detailed visual inspection or significant increase in leachate generation in the cell indicate possible cover deficiencies. In the event deficiencies are discovered, the following corrective measures may be implemented: (1) localized repair or replacement of any synthetic cover material which may have been breached; (2) filling, grading, compacting and revegetating any breach in the natural cover soil which may have occurred; and/or (3) minor backfilling of any small ponded areas.

The vegetative cover will be maintained as required during the growing season, and reseeded and mulched as needed in areas subject to excessive erosion. In general, the cover will not require mowing, due to the local climate. Plants and trees appearing above the vegetative layer will be removed semi-annually.

Fertilization and watering will be completed as required during the growing season. Inspections for rodent and insect control will be conducted during routine post-closure site inspections with extermination scheduled if required.

I-1e(4) Drainage and Erosion. Drainage and erosion control plans and details can be found in Section D-6n, Run-on/Run-off Control. Run-off volumes, transport and containment capacities calculations can be found in Appendix D-6.4.

I-1e(5) Settlement and Subsidence. Because the wastes being disposed of in the hazardous waste landfills are not subject to decomposition, differential settlement related to this cause is not anticipated. Stabilization tests performed on various waste streams will determine proper mixes to assure the wastes will remain consolidated and not be subject to waste dewatering or chemical conversion from solids to liquids.

The cover will not be subjected to stress loadings such as buildings foundations or traffic. Cover maintenance will also be performed to reduce stress associated with any ponding liquids. Therefore, compressive forces will not induce either primary or secondary consolidation. Furthermore, liquifaction of the soil in the cover is not a threat, as liquifaction typically occurs only in relatively loose, saturated, cohesionless soils, which are not to be used as cover material. The yield point of the selected HDPE material is much greater than the expected maximum geomembrane elongation, thereby keeping the liner intact in the event that some settlement does occur.

I-1e(6) Cover Permeability. The clay layer of the composite cover will have a permeability of at least 1×10^{-7} cm/sec^2 and the 80 mil HDPE geomembrane has a 1×10^{-12} cm/sec^2 permeability rating. Additional technical information can be found in Section D-6.

I-1e(7) Freeze/Thaw Effects. The climate of Puerto Rico does not result in freeze/thaw effects.

I-1f Schedule for Closure

This section addresses closure of the proposed facilities at some unforeseen time in the future. Table I-2 shows the planned sequencing of

closure activities. The Proposed Closure Schedules are shown in Figure I-1. The closure sequence and schedule addresses closure for all proposed facilities.

Closure activities will commence within 30 days after receipt of final volume of hazardous wastes at the site. Closure will be completed within 180 days of this occurrence, or longer if necessary. The Region II Administrator will be notified by PROTECO 180 days before the beginning of any closure activities, either partial or final closure. Closure activities will be considered complete when both an independent registered Professional Engineer and PROTECO submit their certification to the Regional Administrator.

I-1g Extensions for Closure Time [40 CFR 264.113(a) 264.113(b)]

PROTECO does not anticipate requiring an extension for closure time for any of their facilities, either existing or proposed. However, if all facilities at the site were to be closed at one time PROTECO envisions that an extension would be necessary. Also, severe weather conditions at the PROTECO site may make completion of closure within 180 days difficult, and an extension of the closure time may be needed. In the event such an extension becomes necessary, for these reasons or due to some other unforeseen circumstances, PROTECO will petition the Regional Administrator for an extension.

I-2 Post-Closure Plan

All hazardous waste management facilities that have disposal operations are required by 40 CFR 264.118 to have a Post-Closure Plan which identifies the activities that must be carried on after the facility is closed. The regulations require that post-closure care of the facility be continued for 30 years after the date of completing closure, unless the EPA Regional Administrator has determined that a reduced period is sufficient to protect human health and the environment.

The Post-Closure Plan will ensure: (1) that the need for further maintenance is minimized and (2) that the post-closure escape of hazardous waste, hazardous waste constituents, leachate, contaminated rainfall or waste decomposition products to groundwater or surface waters or to the atmosphere is controlled, minimized or eliminated so as to protect human health and the environment.

This Post-Closure Plan is based upon an assessment of the potential risk to public health and the environment posed by sudden or planned abandonment of the PROTECO facility. The major factors entering into this assessment are: (1) types of hazardous waste; (2) the environmental setting; (3) the means of treatment, storage and disposal; (4) the environmental pathways by which hazardous waste constituents may travel; and (5) the human and ecological resources which could be affected.

This Post-Closure Plan for the PROTECO facility identifies post-closure care activities that will be carried out after closure and certification. This plan presents the requirements for post-closure care activities, including periodic groundwater and leachate monitoring, site inspections and maintenance activities, and measures to assure restricted site access.

A copy of the approved post-closure plan and any subsequent revisions will be kept at the facility until the facility post-closure period begins. At that time, an updated copy of the approved plan will be kept at the facility.

The Post-Closure Plan will be amended whenever changes in operating plans, facility design or other factors (including a change in the expected year of final site closure) affect the plan. If PROTECO requests a permit modification during the active life of the facility to cover planned changes, a copy of the amended plan will be submitted at the same time as the permit modification application is submitted. If no permit modification is required, a copy of the amended Post-Closure Plan will be submitted within 60 days after a change affecting the Post-Closure Plan occurs.

I-2a Post-Closure Activities

The Post-Closure Plan addresses post-closure facility care of the closed landfills at the PROTECO facility. Post-Closure will begin when individual units are closed. 2

During the post-closure period for landfill care, it is assumed that on-site leachate treatment/storage basins will continue for leachate treatment during the 30 year post-closure period. The post-closure period for Leachate Ponds A and B begins after the post-closure period of the landfills has ended. This assumption is made for the closure/post-closure scenario. For purposes of the closed Leachate Pond B, all landfill inspection and maintenance activities will apply. 2

The post-closure scenario utilized in this plan covers a reasonable time frame of operations to estimate post-closure costs associated with the maximum extent of facility operations until 2010. The Post-Closure Plan will be revised when actual facility operations deviate from this plan according to 40 CFR 264 Subpart G rules and regulations.

I-2b Post-Closure Inspection Plan

The closed landfills will be inspected quarterly and/or after periods of significant rainfall. The purpose is to ensure that the closure measures taken to prevent migration of contaminants are operating as intended. Inspection of the general site will focus on access barriers and security control devices (e.g., fences, locks and gates) to see that they are visible and functioning properly. The components of the landfills which will be inspected include: (1) the cover, (2) the stormwater control system, (3) the leachate collection system, (4) the leachate detection system, and (5) the groundwater monitoring system. Inspection procedures for each of these items are described in more detail below.

The cover will be inspected for: (1) the condition of the vegetation, (2) signs of erosion, and (3) subsidence. The protection provided by the cover vegetation should be complete, repairs to bare spots will include

reseeding, fertilizer application and soil conditioning. As part of the visual inspection of the landfills, the inspector will walk along the top of the berm, look for erosion rivulets or slides on the slopes on either side; for signs of settling and unevenness along the top edge; for signs of accumulated liquids (puddles, dampness) on the sloping sides of the berms. The facility manager will review the inspector's comments, conduct a follow-up inspection of the area noted and determine what maintenance work is needed to correct the problem. Mitigating actions that may be implemented include improving the vegetation and altering contours to prevent stormwater run-off from reaching scour velocities.

Cap settlement will be monitored by site personnel. When an inspection shows that sections of the cover have subsided (lowered), those sections will be repaired as necessary (i.e., backfilled, regraded and/or seeded).

Stormwater run-off is controlled by a series of diversion ditches and berms detailed in Section D-6. The berms will be inspected for cracks; cracks will be marked and their location and size will be recorded. Cracks will be monitored during subsequent inspections; if necessary, affected portions of the berms will be repaired or replaced. The berms will also be checked for surface deterioration. Damaged surfaces will be repaired. Diversion ditches and culverts will be inspected to see that silt, weeds or debris do not accumulate and interrupt flow. Ditches will also be inspected for erosion and undermining. They will be kept cleared and functional.

The leachate collection and transmission systems for the landfills will be inspected to insure that they are operational. The inspection will cover the physical condition and operational status of the manholes, sumps, pumps, valves and electrical system. The leachate will be discharged into the leachate treatment/storage system. A copy of the Post-Closure Inspection Form can be found in Appendix I.2.

I-2c Post-Closure Monitoring Plan

I-2c(1) Air Monitoring Plan. Since the waste handling, landfilling and processing activities will have ceased and the landfills will have been capped, no atmospheric emissions should occur from the closed facility. Post-Closure inspection and maintenance will ensure the cap remains intact and no emissions can occur.

I-2c(2) Groundwater Monitoring Plan. Upon completion of the useful life of the facility, the remaining uncovered landfills will be sealed. However, wastes will still remain buried at the site with the potential for leachate migration and subsequent contamination of groundwater. In accordance with RCRA regulations, a groundwater monitoring plan has been developed for the post-closure period that is capable of detecting the leakage of contaminants from the facility. The plan will utilize the monitoring wells installed for the pre-closure groundwater monitoring program.

The facility groundwater monitoring plan, as discussed in Section E of this application, Groundwater Monitoring, will also be used for monitoring the groundwater during the post-closure period. Parameters and analytical methods will be the same as those used for the active units.

The monitoring frequency for active units is quarterly. It is anticipated that annual sampling during the post-closure period will be adequate for the detection of escaped contaminants.

I-2d Post-Closure Maintenance Plan

Maintenance activities will be required to ensure the integrity of the cover (including removal of tree seedlings), containment structures, leachate system (including pumps and conduit), monitoring equipment for the landfills and Leachate Pond B after closure. In addition, security control devices will be repaired as determined to be necessary by site inspection. (2)

The function and integrity of the final cover for landfills as specified in the Closure Plan for the facility will be maintained as necessary should visual inspection of the cover identify deficiencies. In the event deficiencies are discovered, the following corrective measures may be implemented: (1) repair or replacement of any synthetic cover material which may have been breached and/or (2) filling, grading, compacting and revegetating any breach in the natural cover soil which may have occurred.

The vegetative cover will be maintained as required during the growing season, and reseeded and mulched in areas subject to excessive erosion.

Fertilization will be done as necessary. Watering will be done as required during the growing season, and spraying for rodent and insect control will be conducted according to the findings of the post-closure site inspection plan.

Specific maintenance procedures and schedules for the groundwater monitoring system are outlined in Section E, Groundwater Monitoring, of this application.

I-3 Notice in Deed and Notice to Land Authority [40 CFR 122.25(a)(14)]

PROTECO, Inc., the owner of the property where the facility is located, shall make a notation in the deed to the facility property stating in perpetuity that:

1. The land as described in Appendix I.3 has been used to manage hazardous wastes, and that;

2. The use of the land is restricted in accordance with 40 CFR 264.120.

Within 90 days after closure is completed, PROTECO will submit to the Region II Administrator a survey plat indicating the location and dimensions of landfill cells or other disposal areas with respect to permanently surveyed benchmarks. This plat will be prepared and certified by a

professional land surveyor. The plat filed will contain a note, prominently displayed, which states PROTECO's obligations to restrict the disturbance of the site. This includes eliminating inadvertent site access by the general public and livestock, to be accomplished by maintaining the integrity of the existing fence around the facility. In addition, this notice will indicate that post-closure use of the property on or in which hazardous waste remains after closure must never be allowed to disturb the integrity of the final cover, liners or any containment component, or the function of the facilities monitoring system.

Further, within 90 days of the completion of closure activities, PROTECO will submit to the Regional Administrator a record of the type, location and quantity of hazardous wastes disposed within each cell or area of the facility. Wastes disposed of before the effective date of the RCRA Regulations (July 26, 1982), will be identified by type, location and quantity.

I-4 Closure Cost Estimate [40 CFR 122.25(a)(15) and 264.142]

Closure cost estimates have been developed for the closure of all proposed facilities at PROTECO. Operations included in this cost estimate include the Secure Landfills, Container Storage Building, Tank Farm, Stabilization/Fixation Facility, Stormwater Retention Basin and Leachate Ponds A and B. 2

The closure costs are summarized in Table I-3. Costs for the closure of each operational unit are provided in Tables I-4 through I-9. The costs relating to closure activities such as waste sampling and analysis, removal of waste inventory, decontamination of facilities equipment, containment pads, building floor areas, on-site disposal of decontaminated equipment and facilities, capping of landfill facilities and closure certification are included in each table. The List of Unit Prices used for calculations are provided in Appendix 1.4. The Final Cover Cost Estimate breakdown is provided in Appendix 1.5.

TABLE I-3

CLOSURE COST ESTIMATES

		COST ($)	Table
1.	Landfill	816,000	I-4
2.	Container Storage Building	166,000	I-5
3.	Tank Farm	118,000	I-6
4.	Stabilization/Fixation Facility	28,000	I-7
5.	Stormwater Retention Basin	10,000	I-8
6.	Leachate Ponds A & B	143,000	I-9
	TOTAL	$ 1,281,000	

2

TABLE I-4

CLOSURE COST ESTIMATE FOR
LANDFILL FACILITIES AND ABANDONED
LANDFILL EQUIPMENT

A.	Decontamination Cost (1600 gallons x $0.46/gal -- Volume required to cleanup an estimated 8 pieces of equipment.)	$ 736
B.	Laboratory Verification of Decontamination (7 samples x $260/sample)	2,080
C.	Dismantling and Disposal Cost of One Bulldozer	
	1. Labor (4 man-days x $180/man-day)	720
	2. Landfill of Dismantled Bulldozer (8 cy x $19/cy)	152
D.	Dismantling and Disposal Cost for One Front-End Loader	
	1. Labor (3 man-days x $180/man-day)	540
	2. Landfill of Dismantled Front-End Loader (5 cy x $19/cy)	95
E.	Dismantling and Disposal Cost of One Tractor	
	1. Labor (3 man-days x $180/man-day)	540
	2. Landfill of Dismantled Tractor (10 cy x $19/cy)	190
F.	Dismantling and Disposal Cost of One Half-ton Pick-up Trucks	
	1. Labor (1 man-day x $180/man-day)	180
	2. Landfill Dismantled Pick-up (5 cy x $19/cy)	95

- TABLE I-4 (CONTINUED)

CLOSURE COST ESTIMATE FOR
LANDFILL FACILITIES AND ABANDONED
LANDFILL EQUIPMENT

G. Capping of Landfill (For Individual Costs see Table I-5)	
1. Final Cover at (18,400 yd^2 x \$17,63/yd^2)	\$324,400
H. Fill Material Required to Bring Landfill to Grade (104,900 cy x \$3/cy) Assuming Partial Closure Scenario	314,700
O. Certification	500
Subtotal	645,000
Administration @ 10%	64,500
Subtotal	709,500
Contingency @ 15%	106,425
TOTAL CLOSURE COST ESTIMATE FOR ABANDONED LANDFILL AND EQUIPMENT	\$816,000

Note: Costs represent closure of one stage of the landfill and the filling of the next stage to grade. This is due to only one stage being in operation at a time (largest surface area used for estimate).

TABLE I-5

CLOSURE COST ESTIMATE FOR CONTAINER HANDLING AND STORAGE BUILDING AND CONTAINER DECANT AREA

A. Disposal Cost of Remaining Inventory	
° 675 drums of Hazardous Wastes Various Categories @ $27.50/drum	$ 18,600
° 350 drums of incinerable wastes @ $300/drum	105,000
B. Decontamination Cost	
(9,000 gallons x $0.46/gal)	4,500
C. Dismantling and Disposal Cost of One Forklift	
1. Labor (3 man-days x $180/man-day	540
2. Landfill of Dismantled Forklift (5 cy x $19/cy	95
D. Removal of Landfill Cost of Conveyor, Piping, Pumps and Associated Control Devices	
1. Labor (2 man-days x $180/man-day)	360
2. Landfill (40 cy x $19/cy)	760
E. Laboratory Verification of Decontamination Analysis Cost (1 sample x $260/sample)	260
F. Certification	500

* Estimated quantity is volume required to clean-up 13,500 sf of floor area and 3 pieces of equipment.

Subtotal	131,000
Administration @ 10%	13,100
Subtotal	144,100
Contingency @ 15%	21,615
TOTAL CLOSURE COST ESTIMATE FOR CONTAINER STORAGE BUILDING AND CONTAINER DECANT AREA:	$166,000

(0105c-8)

- TABLE I-6

CLOSURE COST ESTIMATE FOR TANK FARM

A.	Disposal Cost of Remaining Inventory	
	1. 15,000 gal (caustic) @ $0.46/gal (T1)	$ 6,900
	2. 30,000 gal (acid) @ $0.46/gal (T2)	13,800
	3. 10,000 gal (neutralization) @ $0.46/gal (T3)	4,600
	4. 30,000 gal (solvents) @ $0.46/gal (T4 & T5)	13,800
	5. 30,000 gal (oil sludge) @ $0.46/gal (T6)	13,800
	6. 15,000 gal (aqueous waste) @ $0.46/gal (T7)	6,900
	7. 30,000 gal (oils) @ $0.46/gal (T8)	13,800
B.	Laboratory Verification of Decontamination (10 samples x $260/sample)	2,600
C.	Disposal of Washwater + Containment Water During Closure	
	9,600 gallons @ $0.50/gal (washwater)	4,420
D.	Removal and On-Site Landfill Cost of Tanks, Piping, Pumps and Associated Control Devices	
	1. Labor (10 man-days x $180/man-day)	1,800
	2. Equipment Rental	
	a. Crawler Crane (4 days x wk/5 days x $5,400/wk)	4,320
	3. Fuel Consumption	
	a. Crane - (32 hrs x $50/hr)	1,600
	4. Landfill (200 cy x $19/cy)	3,800
E.	Certification	500

* Estimated quantity is volume of water required to clean up 8 tanks, 7,700 sf floor area.

Subtotal	93,000
Administration @ 10%	9,300
Subtotal	102,300
Contingency @ 15%	15,345
TOTAL CLOSURE COST ESTIMATE FOR EXISTING AND PROPOSED TANKS	$118,000

(0105c-9)

TABLE I-7

CLOSURE COST ESTIMATE FOR STABILIZATION/FIXATION FACILITY

A. Process Cost for On-site Stabilization of Inventory (5,000 gal x $0.46/gal),	$ 2,300
B. Removal and On-Site Landfill Costs of Tanks, Equipment, Piping, Pumps and Associated Control Devices	
1. Labor (30 man-days x $180/man-day)	5,400
2. Equipment	
a. Cherry picker (1wk x $950/wk)	950
b. Full decontamination of two vacuum trucks 2,500 gal x $0.46/gal	1,150
3. Fuel	
a. Cherry picker (40 hrs x $5/hr)	200
4. Landfill (300 cy x $19/cy)	5,700
C. Dismantling and Disposal Cost of One Dump Truck	
1. Labor (3 man-days x $180/man-days)	540
2. Landfill of Dump Truck (20 cy x $19/cy)	380
D. Decontamination Cost	
(3,800 gallons* x $0.46/gal)	1,750
E. Laboratory Verification of Decontamination Analysis Cost (10 samples x $260/sample)	2,600
F. Certification	500
Subtotal	22,000
Administration @ 10%	2,200
Subtotal	24,200
Contingency @ 15%	3,630
TOTAL CLOSURE COST ESTIMATE PROPOSED STABILIZATION FACILITY:	$ 28,000

* Estimated quantity is volume required to clean-up 1 silo, 2 tank, 3540 sf floor area and 4 pieces of equipment.

TABLE I-8

CLOSURE COST ESTIMATE FOR
STORMWATER RETENTION BASIN

A.	Disposal of Contaminated Stormwater & Sediments (10,000 gallons x $0.46/gallon)	$ 4,600
B.	Excavation and Disposal of Basin Liner (465 yd^2 x $0.46/$yd^2$)	235
C.	Laboratory Verification of Uncontaminated Subsoil (5 samples x $260/sample)	1,300
D.	Regrading (300 cy x $3/cy)	900
E.	Seeding (425 yd^2 x $0.23/$yd^2$)	100
F.	Certification	500
	Subtotal	8,000
	Administration @ 10%	800
	Subtotal	8,800
	Contingency @ 15%	1,320
	TOTAL CLOSURE COST ESTIMATE FOR STORMWATER RETENTION BASIN	$ 10,000

(0105c-11)

TABLE I-9

CLOSURE COST ESTIMATE FOR
LEACHATE PONDS A & B

A.	Disposal of Contaminated Leachate[1] (120,000 gallons x $0.46/gallon	$ 55,200
B.	Equipment Rental	
	1. Temporary Pug Mill (3wk x $10,000/wk)	30,000
C.	Installation of Leachate Collection Manhole (1 x $1,000/unit)	1,000
D.	Excavation of One Pond Bottom Liners & Appurtenances (200 yd^3 x $10.00/$yd^3$)	2,000
E.	Laboratory Verification of Uncontaminated Subsoil (10 samples x $260/sample)	2,600
F.	Regrading (2,000 yd^3 x $3/$yd^3$)	6,000
G.	Final Cover (900 yd^2 x $17.63)	15,900
H.	Certification	500
	Subtotal	113,200
	Administration @ 10%	11,320
	Subtotal	124,520
	Contingency @ 15%	18,680
	TOTAL CLOSURE COST ESTIMATE FOR LEACHATE PONDS A & B:	143,000

NOTES:
1. Volume assumes only one pond is full (see Section I-1d(4)(b).

(0105c-12)

I-5 Financial Assurance Mechanism for Closure

[40 CFR Sections 270.14(b)(15), 122.25a(1), 264.143, and 254.150]

I.5a Closure Trust Fund [40 CFR Sections 264.143(a) and 264.151(a)(1)]

PROTECO has established an Irrevocable Standby Letter of Credit and Standby Trust Fund Agreement as the selected financial assurance mechanism for the closure of all existing facilities. An original signed duplicate of the trust agreement Letter of Credit and Standby Trust Fund Agreement will be provided at a later date. This standby trust fund will have the US Environmental Protection Agency as its beneficiary. PROTECO reserves the right to change the mechanism of financial assurance, should it deem necessary, as outlined in 40 CFR 151(a)(1).

I-6 Post-Closure Cost Estimate

[40 CFR Sections 122.25(a)(16) and 264.144]

An estimated $4,602,000 will be required to fulfill the monitoring and maintenance activities for the thirty (30) year post-closure period. This estimate represents the cost of the post-closure care requirements for Landfills I and II. The cost estimates are presented by activity in Table I-10, and the List of Unit Prices forming the basis for the calculation are located in Appendix 1.4.

This post-closure cost estimate will be kept on file at the PROTECO site. It will be revised whenever a change in the post-closure plan affects the cost of post-closure. It will be adjusted annually (from the date of its original development) to reflect changes in post-closure costs brought about by inflation. The Department of Commerce's Annual Implicit Price Deflator for Gross National Product (published by the US Department of Commerce in the monthly publication "Survey of Current Business") will be used to make this adjustment.

TABLE I-10

POST-CLOSURE COST ESTIMATE

	1 Year ($)	30 Year ($)	
A. Site Inspections (4 x $100)	$ 4,000	$ 120,000	1
B. Site Security and Maintenance			
1. Supplies	1,000	30,000	
2. Perimeter Fence Maintenance (assume $1000/yr)	1,000	30,000	
3. Maintenance of Bench Marks (survey, 3 man-days every 5 years @ $50/hr)	240	7,200	
C. Site Groundwater Monitoring			
1. 25 wells x $2000/well	50,000	1,500,000	
D. Maintenance of SLF Covers			
1. Irrigation of Vegetative Cover (years 1-3)	1,000	3,000	
2. Fertilization of Vegetative Cover (years 1-3) (20.3 acres x $242/acre)	5,000	15,000	
4. Replacement of Lost Topsoil, furnished & spread (250 sy @ $3.00/sy)	750	22,500	
5. Repair/Replacement of Cover (0.5% complete replacement; 0.5% repair clay and topsoil, and revegetate only.)	10,250	307,500	
E. Leachate Collection, Transport & Treatment Systems			
1. Replacement of Pumps (1 pump per year @ $800/pump)	800	24,000	
2. Leachate Analysis (10 samples)	2,600		
3. Cost of Leachate Collection and Treatment in off-site treatment Facility (leachate volume is estimated to be; an average average of 100,000 gal/yr during post closure; treatment @ $0.46/gal, includes sludge disposal)	46,000	1,380,000	
5. Clean and repair pumps (2 pumps @ $300 each)	600	18,000	

(0105c-13)

TABLE I-10 (CONTINUED)

POST-CLOSURE COST ESTIMATE

	1 Year ($)	30 Year ($)
G. Maintenance of Stormwater Drainage Control Systems		
1. Cleaning of drain pipes, catch basins and control valves; cleaning and dredging of drainage ditches	5,000	150,000
2. Maintenance of Stormwater Basins	1,000	30,000
Subtotal	$ 130,000	$ 3,638,000
Administration @ 10%	13,000	363,800
Subtotal	143,000	4,001,800
Contingency @ 15%	21,450	600,270
TOTAL (1986) POST-CLOSURE COSTS:	$ 164,500	$ 4,602,000

I-7 Financial Assurance Mechanism for Post-Closure [40 CFR Sections 122.25(a)(16) and 264.145]

I-7a Post-Closure Trust Fund [40 CFR 264.145]

PROTECO will establish an Irrevocable Standby Letter of Credit and Standby Trust Fund agreement as the selected financial assurance mechanism. An original signed duplicate of the trust agreement Letter of Credit will be sent to the Region II Administrator by certified mail. This Standby Trust Fund will have the US Environmental Protection Agency as its beneficiary. PROTECO reserves the right to change the mechanism of financial assurance, should it deem necessary, as outlined in 40 CFR 145.

I-8 Liability Insurance [40 CFR Sections 122.25(a)(17) and 264.147]

I-8a Coverage for Sudden Insurance [40 CFR Sections 264.147(a), 264.151 (i) and 264.151(j)]

PROTECO has obtained liability insurance for sudden and accidental occurrences in the amount of $1,000,000 per occurrence with an annual aggregate of $2,000,000 exclusive of legal defense costs. The certificate is worded as specified in 40 CFR 264.151(g). (2)

I-8b Coverage for Non-sudden Insurance [40 CFR 264.147(b), 264.151(i) and 264.151(j)]

PROTECO has obtained liability insurance for non-sudden occurrences in the amount of $3,000,000 per occurrence with an annual aggregate of $6,000,000, exclusive of legal defense costs. The certificate is to be worded as specified in 40 CFR 264.151(g).

APPENDIX I.1

CALCULATIONS OF SOIL LOSS AND EFFECTIVENESS OF DRAINAGE LAYER

BY MMT DATE 6/24/86
CHK'D B DATE 6/27/86

FRED C. HART ASSOCIATES, INC.

SHEET 1 OF 9 PAGE

SUBJECT Proteco Soil Loss JOB NO. B511

Estimate annual soil loss on final cover:

Use Universal Soil Loss Equation:

$$A = RKLSCP$$

ref: Sanitary Landfill Design Handbook, pgs 100-105

where: A = gross erosion in tons/acre/year

R = rainfall energy index (rainfall erosion index)

K = soil erodibility factor

LS = Length/slope factor

C = cover factor

P = practice factor

Determine the following parameters:

1) R is generally determined from published isoerodent maps.

$R = 300$

2. K is determined from Fig. 45 (from "Sanitary Landfill Design Handbook", pgs 100-105) and from Table 2.2 (from "Soil Erosion", edited by M.E. Kirby and R.P.C. Morgan, 1980, pgs 21-48).

- based on revised specifications for final cover, the topsoil layer shall be clay loam or sandy loam:

For clay loam* composed of:

30% clay
15% fine sand (0.05mm - 0.10 mm)
15% sand (0.10 mm - 2.0 mm)
36% silt
3-4% organics

using Fig. 45 with:

51% silt + fine sand
15% sand
3-4% organics
soil structure is fine granular
permeability is moderate

$\therefore K = 0.20$

from Table 2.2, for clay loam, $\therefore K = 0.21$

* see sheet 9 of 9 for USDA classification

for sandy loam* composed of:

15% clay
30% fine sand (0.05 mm - 0.10 mm)
30% sand (0.10 mm - 2.0 mm)
21% silt
3-4% organics.

using Fig 45 with:

51% silt & fine sand
30% sand
4% organics
soil structure is fine granular
permeability is moderate
$\therefore K = 0.21$

from Table 2.2, for sandy loam, $\therefore K = 0.19$

$\therefore$ use $K = 0.21$ (most conservative) for calculations.

3) LS is determined from the following equation**

$$LS = (\lambda/72.6)^m [65.41 \sin^2\theta + 4.56 \sin\theta + 0.065]$$

* see sheet 9 of 9 for USDA classification
** from USDA Agriculture Handbook No. 537, pg 346.

where:

λ = slope length in feet

$\lambda = 50'$ coorespords to slope length when interim terraces are built on 50' centers between landfill benches

$m = 0.5$ for 5% slopes or steeper

θ = slope angle = 18.4° for 1H:3V sideslopes

$$LS = (50/72.6)^{0.5}\left[65.41 \sin^2 18.4 + 4.56 \sin 18.4 + 0.065\right]$$

$LS = 6.7$

note: Figure 4b was not used to eliminate the need of interpolation for 33% slope

4) C is determined from Table 2b

$C = 0.01$ for established grasses

5) P is determined from Table 2-6b (from "Soil Erosion, see sheet 2 of 9, for complete reference)

$P = 0.45$ for 33% slope w/ contour strip cropping and furrows (bulldozer "tracking" supply furrows to cover during final topsoil placement)

$\therefore A = (300)(0.21)(6.7)(0.01)(0.45)$

$A = 1.9$ tons/acre/year

For $A < 5.0$ tons/acre/year

According to Table 29 "Comparative Soil Loss", this value is acceptable.

Conclusion:

Use interim terraces on 50' centers, with clay loam or sandy loam topsoil to reduce soil erosion to acceptable limits.

FIGURE 45 and FIGURE 46

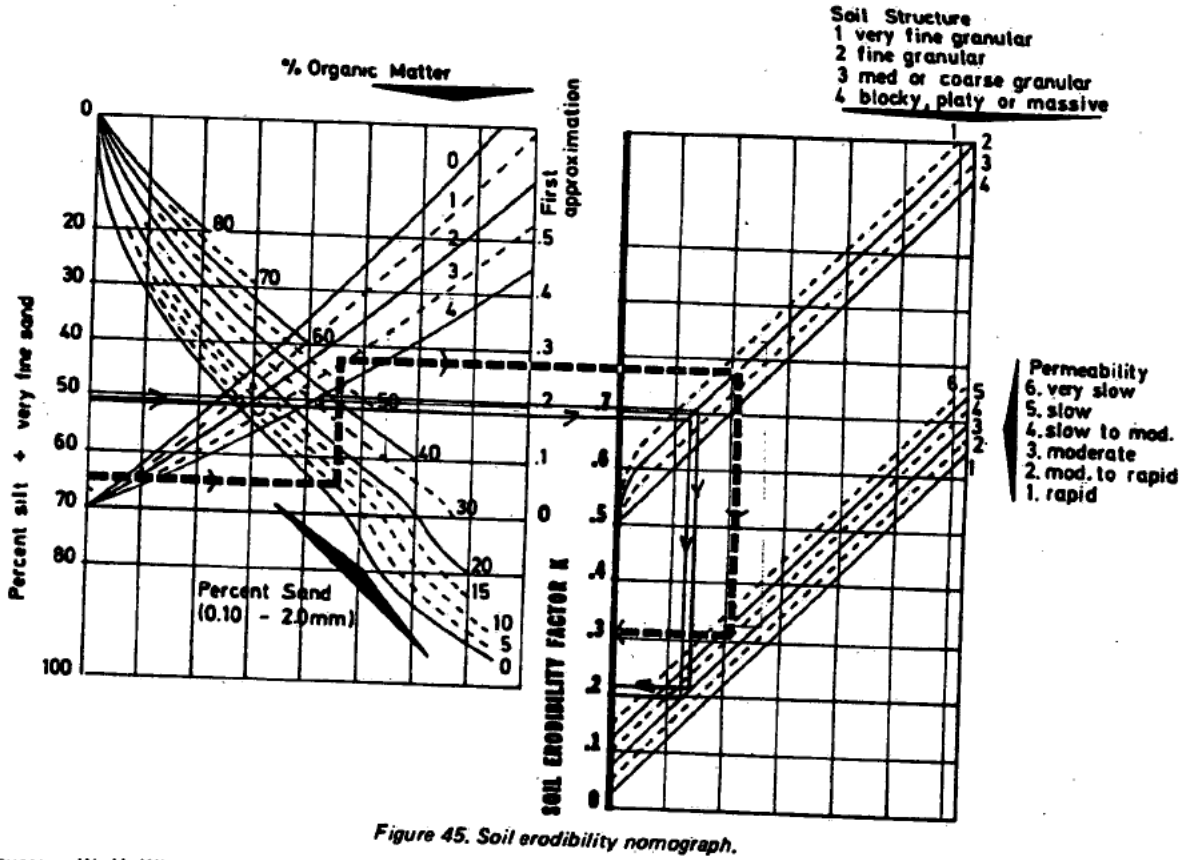

Figure 45. Soil erodibility nomograph.

Source: W. H. Wischmeir, ARS-SWC, Purdue University, February 1, 1971. First published in Journal of Soil and Water Conservation, with acknowledgments to the USDA Agricultural Research Service.

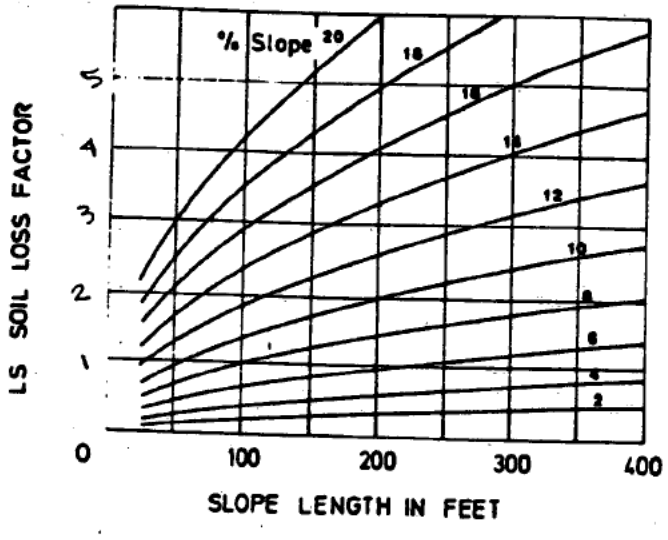

Figure 46. Curves for adjusting plot soil loss to length and steepness of slope.

Source: W. H. Wischmeir, ARS-SWC, Purdue University, February 1, 1971.

Table 2.2. Indications of the general magnitude of the soil-erodibility factor, K[a]

Texture class	Organic matter content		
	< 0.5 per cent	2 per cent	4 per cent
	K	K	K
Sand	0.05	0.03	0.02
Find sand	0.16	0.14	0.10
Very fine sand	0.42	0.36	0.28
Loamy sand	0.12	0.10	0.08
Loamy fine sand	0.24	0.20	0.16
Loamy very fine sand	0.44	0.38	0.30
Sandy loam	0.27	0.24	0.19
Fine sandy loam	0.35	0.30	0.24
Very fine sandy loam	0.47	0.41	0.33
Loam	0.38	0.34	0.29
Silt loam	0.48	0.42	0.33
Silt	0.60	0.52	0.42
Sandy clay loam	0.27	0.25	0.21
Clay loam	0.28	0.25	0.21
Silty clay loam	0.37	0.32	0.26
Sandy clay	0.14	0.13	0.12
Silty clay	0.25	0.23	0.19
Clay		0.13–0.29	

[a] The values shown are estimated averages of broad ranges of specific-soil values. When a texture is near the borderline of two texture classes, use the average of the two K values. For specific soils, use of Figure 2.6 or Soil Conservation Service K-value tables will provide much greater accuracy. From ARS, 1975.

Table 2.10. Erosion control practice factor, P[a]

Land Slope, percentage	Contouring	Contour Strip cropping and Irrigated Furrows	Terracing[b]
1–2	0.60	0.30	0.12
3–8	0.50	0.25	0.10
9–12	0.60	0.30	0.12
13–16	0.70	0.35	0.14
17–20	0.80	0.40	0.16
21–25	0.90	0.45	0.18

[a] From Wischmeier and Smith, 1978.
[b] For prediction of contribution to off-field sediment load.

TABLE 28 and TABLE 29

TABLE 28

"C" Values for Mulching and Grasses

Mulch	
Very heavy 1500 to 2000#/acre	.10*
Heavy 1000 to 1500#/acre	.20
Moderate 500 to 1000#/acre	.40
Light 200 to 500#/acre	.60
Grasses	
Established	.01
New Seeding	
1st month	.60**
2nd month	.40
Remainder 1st year	.05

*Varies with type residue
**With seeding in mulched soil, use the lowest value of C for mulch or grass.

Source: "USDA-ARS Agriculture Handbook", No. 282, 1965, and "Soil Loss Prediction for Kentucky", USDA-SCS, 1964.

TABLE 29

Comparative Soil Loss

Loss (tons/acre/year)	Comments
0–5	Acceptable
5–20	Moderate (consider retention)
20–100	Poor (retention mandatory, consider changes in control practices)
100 and greater	Bad (radical changes in practice necessary)

BY MMT DATE 6/24/86
CHK'D B DATE 6/27/86

FRED C. HART ASSOCIATES, INC.

SHEET 9 OF 9 PAGE

SUBJECT Protero Soil Classification JOB NO. B511

Survey No. ..... Field No. ..... Laboratory No. .....

Locality .....

Soil type ..... Depth .....

MECHANICAL ANALYSIS

U. S. DEPARTMENT AGRICULTURE CLASSIFICATION

Diameter (mm)	Conventional Names	Percent
2–1	Very coarse sand	=
1–0.5	Coarse sand	=
0.5–0.25	Medium sand	=
0.25–0.1	Fine sand	=
0.1–0.05	Very fine sand	=
0.05–0.002	[1]Silt	=
Less than 0.002	[1]Clay	=
Total (Calculated on basis of organic-free oven-dry sample)		=

OTHER CLASSES

Less than 0.005 mm	=
Greater than 2.0 mm	=
Organic carbon	=
pH	=

[1] Note.—Previous to Jan. 1, 1938, 0.05–0.01 mm was called silt, less than 0.01 mm, clay, and less than 0.002 mm, colloid.

INTERNATIONAL CLASSIFICATION

Fraction	Diameter (mm)	Percent
I	2.0–0.2	=
II	0.2–0.02	=
III	0.02–0.002	=
IV	Less than 0.002	=
Total (Calculated on basis of organic-free oven-dry sample)		=

REMARKS:

Date reported .....

MECHANICAL ANALYSIS LABORATORY

FIGURE 37.—In the Division of Soil Survey the mechanical analysis of each soil sample is reported on a card like this.

interpretations. Using the results of this research had the effect of some nearly drastic modifications in the old definitions of class names in terms of actual percentages of sand, silt, and clay as determined in the laboratory, and some modifications in field definitions based upon feel. Whereas laboratory data from mechanical analyses were formerly regarded as general guides only to soil textural class names, they are now regarded as absolute guides to soils of the mainland of the United States. At the same time one cannot say that the standards are yet perfect. Especially may further improvements be expected in the designations used for the textural class of Tundra soils and of Latosols in which the clays generally have different mineralogical compositions from those of soils in temperate regions. Textural class names must be defined wholly in terms of size distribution, however, and not used to express differences in consistence or structure; else the names will lose their fundamental significance.

Definitions of the basic classes are set forth in graphic form in figure 38, in terms of clay, below 0.002 mm; silt, 0.002 to 0.05 mm; and sand 0.05 to 2.0 mm. Although much improved over previous charts, this one is still tentative. Those frequently interpreting laboratory data into soil textural class names will find an enlarged copy of this triangle useful. Verbal definitions of the soil textural classes, defined according to size distribution of mineral particles less than 2 millimeters in diameter, are as follows:

Sand.—Soil material that contains 85 percent or more of sand; percentage of silt, plus 1½ times the percentage of clay, shall not exceed 15.

Coarse sand: 25 percent or more very coarse and coarse sand, and less than 50 percent any other one grade of sand.
Sand: 25 percent or more very coarse, coarse, and medium sand, and less than 50 percent fine or very fine sand.
Fine sand: 50 percent or more fine sand (or) less than 25 percent very coarse, coarse, and medium sand and less than 50 percent very fine sand.
Very fine sand: 50 percent or more very fine sand.

Loamy sand.—Soil material that contains at the upper limit 85 to 90 percent sand, and the percentage of silt plus 1½ times the percentage of clay is not less than 15; at the lower limit it contains not less than 70 to 85 percent sand, and the percentage of silt plus twice the percentage of clay does not exceed 30.

Loamy coarse sand: 25 percent or more very coarse and coarse sand, and less than 50 percent any other one grade of sand.
Loamy sand: 25 percent or more very coarse, coarse, and medium sand, and less than 50 percent fine or very fine sand.
Loamy fine sand: 50 percent or more fine sand (or) less than 25 percent very coarse, coarse, and medium sand and less than 50 percent very fine sand.
Loamy very fine sand: 50 percent or more very fine sand.

Sandy loam.—Soil material that contains either 20 percent clay or less, and the percentage of silt plus twice the percentage of clay exceeds 30, and 52 percent or more sand; or less than 7 percent clay, less than 50 percent silt, and between 43 percent and 52 percent sand.

Coarse sandy loam: 25 percent or more very coarse and coarse sand and less than 50 percent any other one grade of sand.
Sandy loam: 30 percent or more very coarse, coarse, and medium sand, but less than 25 percent very coarse sand, and less than 30 percent very fine or fine sand.
Fine sandy loam: 30 percent or more fine sand and less than 30 percent very fine sand (or) between 15 and 30 percent very coarse, coarse, and medium sand.
Very fine sandy loam: 30 percent or more very fine sand (or) more than 40 percent fine and very fine sand, at least half of which is very fine sand and less than 15 percent very coarse, coarse, and medium sand.

Loam.—Soil material that contains 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand.

Silt loam.—Soil material that contains 50 percent or more silt and 12 to 27 percent clay (or) 50 to 80 percent silt and less than 12 percent clay.

Silt.—Soil material that contains 80 percent or more silt and less than 12 percent clay.

Sandy clay loam.—Soil material that contains 20 to 35 percent clay, less than 28 percent silt, and 45 percent or more sand.

Clay loam.—Soil material that contains 27 to 40 percent clay and 20 to 45 percent sand.

Silty clay loam.—Soil material that contains 27 to 40 percent clay and less than 20 percent sand.

Sandy clay.—Soil material that contains 35 percent or more clay and 45 percent or more sand.

Silty clay.—Soil material that contains 40 percent or more clay and 40 percent or more silt.

Clay.—Soil material that contains 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Necessarily these verbal definitions are somewhat complicated and, perhaps, not entirely adequate for unusual mixtures near the boundaries between classes. Some of the definitions are not entirely mutually exclusive, but the information needed to make them so is lacking. Departures from these definitions should be made only after careful joint research between field and laboratory scientists.

APPENDIX I.2

POST-CLOSURE INSPECTION FORM

POST-CLOSURE INSPECTION FORM

	Acceptable	Unacceptable
General Site		
Access Barriers	_____	_____
Security Control Devices	_____	_____
Cover		
Adequate vegetation	_____	_____
Integrity with respect to erosion	_____	_____
Subsidence	_____	_____
Stormwater Control System		
Integrity of berms	_____	_____
Accumulation of debris	_____	_____
Erosion and undermining	_____	_____
Leachate Collection and Detection System		
Condition and operations status of:		
• Manholes	_____	_____
• Sumps	_____	_____
• Pumps	_____	_____
• Valves	_____	_____
• Electrical system	_____	_____
Groundwater Monitoring Wells		
Locks	_____	_____
Access	_____	_____
Integrity of casing and soil plug	_____	_____

BY: _____

Date: _____

* Follow-Up on Unacceptable Items:

How Resolved	Date	By

APPENDIX I.3

NOTICE TO DEED/NOTICE TO LAND AUTHORITY

This document will be supplied upon completion of survey.

APPENDIX I.4

LIST OF UNIT PRICES

The following table is a list of unit prices used in the derivation of closure cost estimates for proposed units at the PROTECO Facility. These unit prices are based on compromises between HART estimates and the NOD, acceptance of NOD values and updated cost information.

LIST OF UNIT PRICES

	Item	Unit	($)
1.	Excavation and placement of clean soil	Cu yd	3.00
2.	Excavation and placement of contaminated soil	Cu yd	10.00
3.	Off-site disposal of waste (includes truck shipment up to 100 miles)	Cu yd	N.P.
4.	Stabilization of liquid waste	Gallon	0.46
5.	Sludge Stabilization	Cu yd	92.43
6.	Standard Cover	Sq yd	17.63
7.	Soil analysis (average price)	Each	260.00
8.	Water analysis (of washwater, average price)	Each	260.00
9.	Waste testing (for determination of stabilization requirements, applicant's price)	Each	550.00
10.	Decontamination of equipment	Lump Sum	800.00
11.	Engineer's certification	Lump Sum	500.00
12.	Spill absorbent (includes off-site disposal cost	Drum	75.00
13.	Cement kiln dust	Cu yd	15.90
14.	30 mil PVC liner (installed) 80 mil HDPE liner (installed	Sq yd	4.00 8.00
15.	Filter fabric (installed Drainage net	Sq yd	0.60 0.60
16.	Drainage material (in-place)	Cu yd	15.00
17.	Hydroseeding	Sq yd	0.23
18.	Operators (fully burdened)	Day	180.00
19.	Front end loader	Day	owned by facility
20.	Inspections (during post-closure)	Each	1,000.00
21.	Groundwater monitoring (for 25 wells, semi-annual sampling)	Each	50,000.00

APPENDIX I.5

FINAL COVER COST ESTIMATE

FINAL COVER COST ESTIMATE

The Final Cover consists of:

1 foot of soil (vegetated)
1 foot of protective cover material
Filter Fabric
Drainage Net
80 mil synthetic liner
2 feet of clay

For one square yard of cover, the quantities required and costs are as follows:

		Cost ($)
Seeding	1 yd^2 @ \$0.23/yd^2	0.23
Soil for vegetation	0.33 yd^3 @ \$3/yd^3	1.00
Protective Cover	0.33 yd^3 @ \$1.53/yd^3	0.50
Filter Fabric	1 yd^2 @ \$0.60/yd^2	0.60
Drainage Net	1 yd^2 @ \$0.60/yd^2	0.60
80 mil Synthetic Liner	1 yd^2 @ \$8.00/yd^2	8.00
2' Clay	0.67 yd^3 @ \$10/yd^3	6.70
	TOTAL	17.63

NOTE: This represents a \$1.20/yd^2 increase over the NOD valve. ⚠

APPENDIX I.6

ANNUAL NET EVAPORATION RATE FOR PONCE 4 EAST

BY BH DATE 4-24-86
CHK'D DH DATE 4-29-86

FRED C. HART ASSOCIATES, INC.

SHEET ___ OF ___ PAGE

SUBJECT ANNUAL NET EVAPORATION RATE JOB NO. _____

ANNUAL PRECIPITATION AND PAN EVAPORATION RATES FOR RAIN GAUGE LOCATION PONCE 4 EAST

MONTH 1983	PRECIP (IN.)	PAN EVAP. (IN.)	MONTH 1984 CONT.	PRECIP (IN.)	PAN EVAP (IN.)
NOV	9.88	6.08	NOV	11.04	5.18
DEC	0.64	4.88	DEC	0.62	5.19
1984			1985		
JAN	1.85	5.69	JAN	0.15	5.42
FEB	1.65	5.81	FEB	1.51	5.82
MAR	1.30	7.87	MAR	2.12	7.20
APR	2.00	7.81	APR	1.23	7.48
MAY	0.0	NO DATA	MAY	8.51	7.98
JUN	1.53	7.37	JUN	0.95	7.63
JUL	4.52	8.35	JUL	1.21	8.25
AUG	1.02	8.68	AUG	1.74	8.30
SEP	10.75	5.88	SEP	5.64	6.56
OCT	5.24	6.14	OCT	28.31*	5.46

SOURCE: CLIMATOLOGICAL DATA
PUERTO RICO AND VIRGIN ISLANDS
NATIONAL CLIMATIC DATA CENTER
ASHEVILLE, NC

TOTAL PRECIP. FOR PERIOD = 75.10 (*EXCLUDES OCT, 1985)
TOTAL PAN EVAP. FOR PERIOD = 155.03 (EXCLUDES MAY, 1983)
NUMBER OF MONTHS USED DURING PERIOD = 23

MONTHLY AVG PRECIP. = 75.10/23 = 3.27 in
MONTHLY AVG EVAP. = 0.7 (155.03/23) = 4.72 in (INCLUDES PAN EVAP. COEFFICIENT)
NET LOSS PER MONTH DUE TO EVAP. = 4.72 - 3.27
= 1.45 in/month
= 17.4 in/yr

APPENDIX I.7

TEST PROCEDURES FOR EVALUATION OF EXTENT OF CONTAMINATED SOIL

2

TEST PROCEDURES FOR EVALUATION OF EXTENT OF CONTAMINATED SOIL

To achieve "clean" closure, wastes and/or contaminated soils from the units will be characterized and processed according to the Waste Analysis Plan and Process Description, Section C and D, respectively.

Following removal of liner and/or leak detection systems, all visually contaminated soil will be excavated based on discoloration of the soil media. Excavation will continue until no discoloration of the soil is observed.

The soil remaining after excavation will be tested to verify that contaminated materials have been removed. A grid system will be devised for each unit based on the surface area of the sides and bottom of the required excavation. One or more composite samples will be taken for each grid unit depending on any variables such as soil classification determined to be present at the excavation. At a minimum, one composite sample will be taken per 1,000 square feet of surface area of the excavated unit. Composites will be comprised of five separate samples taken within a single grid section. The soil samples will be taken at the depth of the remaining undisturbed soil after the visually contaminated soil has been excavated. A hand-driven bucket auger or a 24-inch split spoon sample will be used. Each sample will be thoroughly mixed prior to compositing. Individual samples will then be mixed to produce a composite sample that is representative of the grid section. All samples will be taken, mixed and composited using stainless steel instruments. All pails and mixing bowls will be thoroughly cleaned with an appropriate solvent prior to use. A portion of each sample used to comprise the composite will be retained to allow further refinement of the contaminated soil area should analysis determine it to be necessary.

All samples will be recorded, preserved and packaged for analysis following appropriate handling and chain-of-custody procedures as identified by the USEPA. Each composite sample will be characterized and analyzed for hazardous constituents. Analytical procedures will be selected

based on wastes disposed of in each unit and may include, but are not restricted to:

- Priority Pollutant Scan
- Inorganics/Organics Scan
- EP Toxicity
- Hazardous Characteristics

It is assumed that the samples will be non-hazardous and that no additional soil will have to be removed and disposed. If the samples are determined to be hazardous, and there may be reason to believe that contamination may not exist over the entire area of the grid section from which the sample was taken, portions of the composite may then be analyzed or more testing may be performed on modified grid areas to allow a more precise determination of the contaminated soil area. The area of the unit the contaminated sample was taken from will be excavated and disposed as an incoming hazardous waste. The excavation will be to a depth of 3", 6", 9" or 12", based on criteria such as concentrations present, soil classification and assumed depth of the residual contamination. Additional samples will be obtained in the same manner as previously described and analyzed to confirm that all hazardous soils have been removed.

APPENDIX I.8

INSURANCE COVERAGE

2

PROTECO fs pursuing arrangements with an industry trade group setting up a captive insurance group for various facilities having difficulty in maintaining insurance. The enclosed insurance coverage exists presently at the facility.